

REMARKS

By the present Amendment, claims 1-7 are cancelled and claims 8-13 are added. This leaves claims 9-13 pending in the application, with claims 8 and 12 being independent.

Substitute Specification

The specification is revised to eliminate grammatical and idiomatic errors in the originally presented specification. The number and nature of the changes made in the specification would render it difficult to consider the case and to arrange the papers for printing or copying. Thus, the substitute specification will facilitate processing of the application. The substitute specification includes no "new matter". Pursuant to M.P.E.P. § 608.01(q), voluntarily filed, substitute specifications under these circumstances should normally be accepted. A marked-up copy of the original specification is appended hereto.

Rejections Under 35 U.S.C. §§ 102 and 103

Claim 8 covers a piston accumulator comprising an accumulator housing in the form of a cylindrical tube 1 with first and second working chambers 5 and 6 and with a piston stroke area 19. The cylindrical tube has a wall adjoining the piston area and being a unitary one-piece component of the cylindrical tube. A piston 15 separates the working chambers from one another, and is movable in an axial direction within the piston stroke area. First and second closing components close the axial ends of the cylindrical. The first closing component 7 is formed by shaping a reshaping area 9 of the wall of cylindrical tube 1. A stop element 25 is in an interior of the cylindrical tube at a transition from the piston stroke 19 area to reshaping area 9. The stop element restricts movement of the piston before reaching the reshaping area. The stop element is a level plate having a crowned, convex cambered circumferential surface 27. A

shoulder 23 is inside the cylindrical tube for supporting and retaining the stop element. A concave cambered surface is in the cylindrical tube adjacent to the shoulder, and receives and is formed about the circumferential surface of the stop element during deformation of the wall in forming first closing component 7 to retain positively the stop element in place in the cylindrical tube against its axial movement.

By forming the piston accumulator in this manner, the stop element is positively secured against axial movement and allows the accumulator housing to be formed in a simple and efficient production process without adversely affecting its operational behavior.

Numerous alternative rejections are raised in the Office Action, requiring each to be addressed separately. Claims 1-6 stand rejected under 35 U.S.C. § 102 as being anticipated by WO 02/12731 to Yuda or EP 1,308,634 to Yuda. Claims 1 and 2 stand rejected under 35 U.S.C. § 102 as being anticipated by FR 985,370 to Simmonds or DE 739,831 to Rauh. Each of these rejections are presented without specific comments.

Claims 1-4 stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 2,828,760 to Taylor. The Taylor patent is cited for an accumulator having housing 11 with a separating piston movable in an axial direction. The housing is allegedly in the form of a cylindrical tube closed off from both ends, with one end having a reshaping area formed as an integral part of the remaining wall of the accumulator housing 11. A stop element is allegedly provided at the interface of the cylindrical portion of the tube and the reshaping area to act as a stop for the piston. The stop element is allegedly fixed axially by retaining surfaces on this cylindrical tube and is formed by a shoulder forming a recess in the inner wall below, where the shoulder extends out, and has a second retaining portion that extends inward from the shoulder portion just above the shoulder.

Claims 1-4 also stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 3,064,686 to Gratzmuller. The Gratzmuller patent is cited particularly for having a stop element for restricting movement to the piston at a reshaping area located at the top of the cylindrical portion of the accumulator housing.

Claims 1-4 additionally stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 3,015,345 to Michael. The Michael patent is cited for an accumulator having a separating piston 29 having a closing component near 17 having a reshaping area with a stop element restricting movement of the piston before the reshaping area is reached. The stop element is allegedly fixed against axial movement.

Claims 1-6 stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 2,734,531 to Bizak. The Bizak patent is cited for an accumulator having a stop element restricting movement of its piston before its reshaping area is reached. Such stop element is seen to be positively locked against axial movement by retaining surfaces present on the inside wall of the tube. The stop element is allegedly formed as a plate 46 (see Fig. 2) having a hole in its center. The plate allegedly is level or can have a crowned or convex surface extending toward the reshaping area. This plate is shown at the top of the accumulator in the Bizak patent, with the plate being more properly identified by the number 42.

Claim 7 stands rejected under 35 U.S.C. § 103 as being unpatentable over the International or EP patent to Yuda in view of U.S. Patent No. 2,884,955 to Yost. The Yost patent is cited for use of a cambered partial surface to seat a lock element to retain a piston in a specific stroke area. In support of the rejection, it is contended that it would obvious to modify the Yuda wall to have a cambered partial surface seat to receive a circular cross section element to retain the piston in a specific stroke area. However, I believe that the Examiner intended to

refer to the retaining ring 66' which is fitted into groove 67 in the cylindrical wall to limit downward displacement of the plug piston 64 within the cylinder.

Claim 8 is patentably distinguishable over WO 02/12731 to Yuda for failing disclose a piston accumulator. The accumulator of this Yuda International patent is a diaphragm accumulator. Additionally, the Yuda chamber forming member 17, apparently equated to the claimed stop element, is not in the form of a level plate having a crowned, convex cambered circumferential surface used in forming the concave cambered surface in the cylindrical tube, as recited in claim 8. Thus, this Yuda patent does not anticipate or render obvious the subject matter of claim 8.

The EP 1 308 634 patent to Yuda appears to have the same disclosure as that Yuda International patent discussed immediately above, and thus, is distinguished for the same reasons. Such reasons are not repeated to avoid burdening the record.

The Simmonds French patent discloses a complex multi-part piston with the parts thereof being relatively movable. An end ring 36 of the piston apparently engages a housing ring 39 to limit the piston's upward movement. However, ring 39 is not a level plate having a crowned, convex cambered circumferential surface as claimed. Moreover, the housing does not have a cambered surface in the tube adjacent a shoulder which is formed about the stop element circumferential surface during deformation of the wall in forming the first closing component. Thus, the Simmonds patent does not anticipated or rendered obvious the subject matter of claim 8.

The Rauh patent discloses a device having a housing 1 with an integral or unitary flange 17 for acting as a stop for piston 3. Claim 8 patentably distinguishable over this patent by the stop element being a level plate having a crowned, convex cambered circumferential surface, by

the shoulder and by the concave cambered surface in the cylindrical tube formed by the stop element circumferential surface. Thus, the Rauh patent does not anticipate or render obvious the subject matter of claim 8.

The Taylor patent discloses a housing 3 having an integral or unitary internal flange for engaging piston 13. In this manner, claim 8 is patentably distinguishable by the level plate with a crowned, convex cambered circumferential surface, the shoulder, and the concave cambered surface formed by the stop element surface, as recited in claim 8. Thus, the Taylor patent does not anticipate or render obvious the subject matter of claim 8.

The Gratzmuller patent is similar to the Taylor patent in disclosing an integral or unitary flange in its housing 1 for engaging the piston. Thus, it does not have the features of the stop element circumferential surface, shoulder and concave surface, as discussed above, relative to the Taylor patent. Thus, the Gratzmuller patent does not anticipate or render obvious the subject matter of claim 8.

The Michael patent discloses a housing portion 13 which is separate from the remainder of the housing 11. The housing portion 13 has an integral or unitary flange extending radially inwardly for engaging the piston 9. However, that flange does not constitute a level plate having a crowned, convex cambered circumferential surface. The Michael housing portion does not have a shoulder inside the housing to support the stop element or the concave cambered surface in the tube adjacent the shoulder and formed during deformation of the wall forming the first closing component. Thus, the Michael does not anticipate or render obvious the subject matter of claim 8.

Relative to the Bizak patent, the Office Action refers to a “plate 46” as providing the stop element. However, item 46 of the Bizak patent is a space between spring fingers 44 of spring

member 42. The spring member 42 is mounted on the end of a shell 41 formed as a separate member and located within the Bizak housing outer shell or housing 10. Since end cap or closing element 15 is located at the opposite end of housing 10 from the spring member 42, the Bizak end cap 15 cannot provide a shoulder for supporting that spring member interpreted apparently as the claimed level plate. Additionally, the Bizak spring member does not have the claimed crowned, convex cambered circumferential surface. Further, the Bizak separate end cap 28 does not provide a closing component formed by a wall of the cylindrical tube which is a unitary one-piece component of the tube, as recited in claim 8. Also, there is no concave cambered surface adjacent a shoulder in Bizak inner shell 41 that receives and is formed about the circumferential surface of the stop element during deformation of the wall in forming the closing element, as recited in claim 8. Thus, the Bizak does not anticipate or render obvious the subject of claim 8.

Relative to the proposed combination of either of the two Yuda patents in view of the Yost patent, the Yost patent is cited for allegedly teaching a cambered partial surface to seat a lock element 66' to retain the piston in a specific area. However, the Yost patent does not disclose the deficiencies in the two Yuda patents discussed above, particularly relative to the crowned, convexed cambered circumferential surface on the rigid stop element and the mating concave cambered surface in the cylindrical tube. Additionally, it does not have the closing component formed by shaping a reshaping area of the wall of the cylindrical tube where the wall is a one-piece component of the tube, as recited in claim 8. Accordingly, the proposed combination does not render the subject matter of claim 8 obvious.

Claims 9-11, being dependent upon claim 8, are also allowable for the above reasons. Moreover, these dependent claims recited additional features further distinguishing them over the

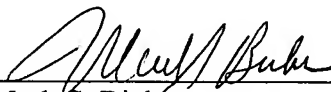
cited patents. Specifically, the discharge opening of claim 9, the level surfaces of claim 10, and the gas supply space and hydraulic fluid space of claim 11 are not anticipated or rendered obvious of the cited patents, particularly within the overall claimed combinations.

Claim 12 is similar to claim 8, except that the rigid stop element is now recited as being an annular element rather than a level plate. Thus, claim 12 is patentably distinguishable over the cited patents for the same reasons advanced above, which reasons are not repeated to avoid burdening the record.

Claim 13, being dependent upon claim 12, is also allowable for the above reasons. Moreover, claim 13 is distinguishable over the cited patents for the additional reasons advanced above relative to claim 11.

In view of the foregoing, claims 8-13 are allowable. Prompt and favorable action is solicited.

Respectfully submitted,



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Dated: October 18, 2007